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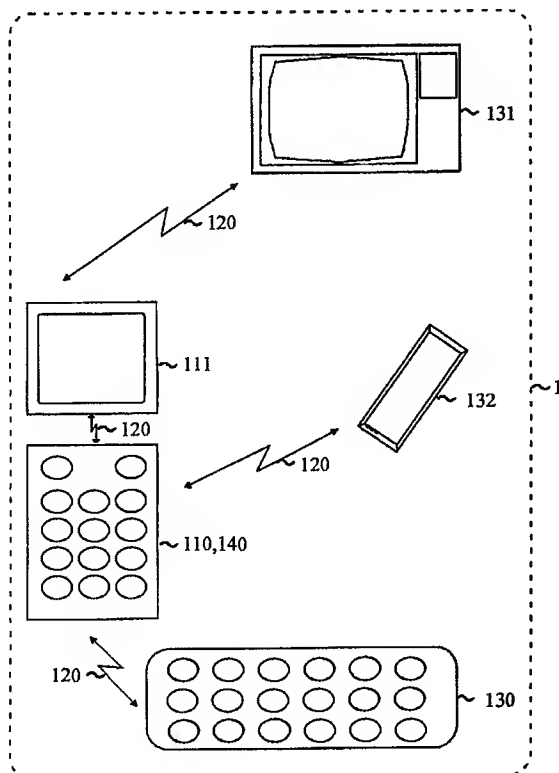
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(54) Title: MODULAR WIRELESS TERMINAL DEVICE



(57) Abstract: The present invention relates to a modular wireless terminal device (1) which comprises one or more basic modules (110 11n), of which at least part communicates with each other by means of a wireless local connection (120). According to the invention, the terminal device comprises one or more alternative modules (130 13n), which communicate by means of the aforementioned wireless local connection, and a central module (140) which is used to identify the basic modules and alternative modules in the immediate environment and to keep a record of them, which is used to identify the utilization classes of the aforementioned modules and to keep a record of them, which is used to identify the states of the aforementioned modules and to keep a record of them and which is used to replace a module with another module included in the same utilization class.

WO 02/063835 A1



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MODULAR WIRELESS TERMINAL DEVICE**FIELD OF THE INVENTION**

The invention relates to telecommunication.
In particular, the invention relates to a new and im-
5 proved modular wireless terminal device.

BACKGROUND OF THE INVENTION

Wireless terminal devices such as e.g. mobile
stations have become increasingly common during the
10 last ten years. In addition, wireless local connec-
tions are coming. A wireless local connection is used
to mean a connection of a short range, of the order of
about ten meters at the most, based on radio link
technique, that is intended to be used primarily in-
15 doors advantageously so that the receiver and the
transmitter are located in the same room and using
which more than two devices may exchange information.
One specific purpose of the wireless local connections
is to substitute the cable connections currently used.
20 Further, with the wireless local connections one aims
to replace the infrared links the disadvantage of
which is a short range, which is typically only a cou-
ple of meters. Further, the infrared links require
precise alignment, and there cannot be obstacles be-
25 tween the transmitter and the receiver. In addition,
using the infrared links, only two devices at a time
can exchange information.

One of these wireless local connections is
the Bluetooth technique. Bluetooth uses an ISM band
30 (Industrial Scientific Medicine, ISM) of 2.4 GHz for
data transfer. In most of the countries, this fre-
quency band is located between 2400-2483,5 MHz. The
frequency band has been divided into channels of 1
MHz. The protocol used by the Bluetooth is a combina-
35 tion of circuit and packet switching. In data transfer
one uses a spread spectrum based on frequency hopping.

The maximum range is normally of the order of ten meters. By increasing the transmission power the range can be increased even to hundred meters. The connections may be bilateral or multilateral. The Bluetooth
5 is advantageously implemented as a micro chip, which is either integrated directly into the device utilizing it, or it is installed afterwards as an additional card.

For mobile stations and other wireless terminal
10 nal devices, the wireless local connection means, among other things, a more flexible usability than ever. If e.g. the headphones and microphone of the mobile station are cordless, the use of the mobile station e.g. for a motorist is clearly more easy and safe
15 than nowadays.

The problem with the known wireless terminal devices is, however, the fact that they require manufacturer and model specific solutions. Although e.g. the mobile station would be equipped with headphones
20 utilizing the wireless local connection, the headphones in question are manufactured specifically for the mobile station in question instead of using any available headphones. In that case e.g. the selection of interfaces is restricted and does not offer a real
25 freedom of choice. Specially the needs of handicapped persons and other special groups are easily ignored.

OBJECTIVE OF THE INVENTION

The objective of the present invention is to
30 disclose a new kind of device which eliminates the above-mentioned disadvantages or at least significantly alleviates them. One specific objective of the present invention is to disclose a modular wireless terminal device which enables the utilization of the
35 devices in the immediate environment as alternative modules of the terminal device.

BRIEF DESCRIPTION OF THE INVENTION

The present invention concerns a modular wireless terminal device such as e.g. a digital mobile station or corresponding. The terminal device in question comprises a set of basic modules, each for performing a predetermined function of the terminal device in question that is in accordance with the utilization class, of which basic modules at least part communicates with each other by means of the wireless local connection. The term utilization class is used to mean classes into which the modules are divided according to their use. Utilization classes include e.g. a display, keyboard, loudspeaker and microphone. The wireless connection is e.g. a Bluetooth connection or the like.

According to the invention, the terminal device comprises one or more alternative modules, each for performing a predetermined function of the terminal device in question that is in accordance with the utilization class, which alternative modules communicate by means of the aforementioned wireless local connection. The term in the immediate environment is used to mean something in the range of the wireless local connection in use. The alternative module functions thus as a substitutive alternative for some basic module. A basic module included in the utilization class display is e.g. the display of the terminal's own, and an alternative module included in the same utilization class is e.g. a television equipped with a wireless local connection. Correspondingly, a basic module included in the utilization class keyboard is e.g. the keyboard of the terminal's own, and an alternative module included in the same class is e.g. the keyboard of a computer that is equipped with a wire-

less local connection. The term module is hereinafter used to refer both to basic and alternative modules.

Further, the terminal device in question comprises a central module which is used to identify the
5 basic modules in the immediate environment of the central module as well as the alternative modules. Further, the central module is used to keep a record of the identified modules in question. Further, the central module is used to identify in what class each basic
10 module and alternative module in the immediate environment is included. Further, the central module is used to keep a record of the identified utilization classes of the modules in question. Further, the central module is used to identify the state of each module
15 in the immediate environment. Further, the central module is used to keep a record of the identified states of the modules in question. The term module is used to mean the fact of whether the module in question is engaged (e.g. in use, closed or defective) or
20 available. Further, the central module is used to replace the basic module with an alternative module included in the same utilization class. Correspondingly, the alternative module in use is replaced with the original basic module when necessary. The replacement
25 is performed when the central module has received a command from the user to perform the replacement in question. Thus, thanks to the invention, the user may keep changing the modules to be used according to his or her need when s(he) so wishes. Further, the terminal device in accordance with the invention may be so
30 configured that the replacement happens automatically, e.g. when a module being in use is damaged, it is automatically replaced with some module being found in the immediate environment.

35 In one embodiment of the invention, the central module is used to identify the capacity classes of the basic modules and alternative modules as well

as a record is kept of them. The modules have been divided into capacity classes according to their capacity. The term capacity is used to mean the suitability of the module in question for the function in accordance with its class. For example in a situation in which there are several alternative modules included in the same class in the immediate environment of some basic module, all the modules in question may be arranged in order of superiority by means of the capacity classification and thus determine whether it is worthwhile replacing the basic module with some of the alternative modules, and if it is worthwhile, then with what. For example the keyboard of a computer of the above-mentioned example is determined to belong to a better capacity class than the keyboard of the terminal's own, in case the keyboard of the computer in question is e.g. better as concerns its usability than the keyboard of the terminal's own. Correspondingly e.g. the remote controller of a television is determined to belong to a worse capacity class than the keyboard of the terminal's own, in case the remote controller in question is e.g. worse as concerns its usability than the keyboard of the terminal's own.

In one embodiment of the invention, the central module is used to notify the user of the mobile station, in case the state of such a module becomes available in the immediate environment of the central module that is included in the same utilization class but in a better capacity class than some module in use at the moment. In that case, when the user so wishes, s(he) may replace the module currently used with a module becoming available utilizing the central module.

In one embodiment of the invention, each module has its own identifier which comprises a field for the utilization class of the module in question, a field for the state of the module in question, as well

as a field for the capacity class of the module in question. The identifier is transmitted to the other modules including the central module e.g. in a signaling message of a wireless local connection.

5 In one embodiment of the invention, the basic modules can be physically separated from each other.

In one embodiment of the invention, the terminal device is a digital mobile station.

The advantage of the present invention over
10 prior art is that by means of it, the modules of a wireless terminal device, such as e.g. user interface units may be optionally replaced with units being found in the immediate environment that thus function as the alternative modules of the terminal device. In
15 that case it is possible to introduce different kinds of user interface solutions e.g. for special user groups as well as to facilitate the daily use of the terminal device by offering better, already existing and familiar user interfaces for the needs of the mo-
20 bile communication. At the same time one avoids the model and manufacturer-specific customized solutions that do not offer a real freedom of choice.

BRIEF DESCRIPTION OF THE DRAWINGS

25 In the following section, the invention will be described by the aid of the accompanying examples of its embodiments with reference to the accompanying drawing, in which

Fig. 1 is a block diagram illustrating one
30 device in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 is a block diagram illustrating, by way of example, the components of one terminal device
35 in accordance with the invention. The modular wireless terminal device 1 presented, by way of example, in

Fig. 1 is a digital mobile station. The mobile station 1 in question comprises two basic modules each for performing a function in accordance with their own utilization class. The basic modules communicate with each other by means of a wireless local connection, in the example of Fig. 1 by means of the Bluetooth connection 120. The basic modules are the keyboard 110 and display 111 of the mobile station, which are included in the utilization classes display and keyboard, accordingly. The basic modules can be physically separated from each other.

The mobile station 1 further comprises alternative modules each for performing some predetermined function in accordance with their own utilization class, which alternative modules communicate by means of the Bluetooth connection 120. The term "in the immediate environment" is used to mean something within the range of the wireless local connection in use. The alternative module thus functions as a substitutive alternative for some basic module. In the example of Fig. 1, the alternative modules of the keyboard 130 of a computer that is included in the utilization class keyboard, television 131, which is included in the utilization class display, the remote control 132 of the television 131, as well as of the keyboard 130 of the computer both the television 131 and remote control 132 communicate with the devices in their immediate environment by means of the Bluetooth connection 120.

Further, the mobile station 1 comprises a central module 140 which is used to identify the basic modules and alternative modules in the immediate environment of the central module in question. Further, the central module 140 is used to keep a record of the identified modules in question. Further, the central module 140 is used to identify in what utilization class each basic module and alternative module in the

immediate environment is included. Further, the central module is used to keep a record of the identified utilization classes of the modules in question. Further, the central module 140 is used to identify the state of each module in the immediate environment. Further, the central module 140 is used to keep a record of the identified states of the modules. The term state of the module is used to mean the fact of whether the module is engaged (e.g. in use, closed or defective) or available. Further, the central module 140 is used to replace the basic module with an alternative module included in the same utilization class. Correspondingly, also the alternative module in use is replaced with the original basic module when necessary. The replacement is performed when the central module 140 has received a command from the user to perform the replacement in question. Thus, thanks to the invention, the user may keep changing the modules to be used according to his or her need when s(he) so wishes.

In the example of Fig. 1 the central module 140 is used to identify the capacity classes of the basic classes and alternative classes as well as a record is kept of them. The modules have been divided into capacity classes according to their capacity. The term capacity is used to mean the suitability of the module in question for the function in accordance with its class. For example in a situation in which there are several alternative modules included in the same class in the immediate environment of some basic module, all the modules in question may be arranged in order of superiority by means of the capacity classification and thus determine whether it is worthwhile replacing the basic module with some of the alternative modules, and if it is worthwhile, then with what. In the example of Fig. 1, the keyboard 130 of a computer is determined to belong to a better capacity

class than the keyboard 110 of mobile station's own, since the keyboard 130 of the computer in question is better as concerns its usability than the keyboard 110 of the terminal. Correspondingly, the remote controller 132 of a television is determined to belong to a
5 worse capacity class than the keyboard of the terminal's own, since the remote controller 132 in question is worse as concerns its usability than the keyboard 110 of the terminal's own.

10 In the example of Fig. 1, the central module 140 is used to notify the user of the mobile station 1, in case the state of such a module becomes available in the immediate environment of the central module 140 that is included in the same utilization class
15 but in a better capacity class than some module in use at the moment. In that case, when the user so wishes, s(he) may replace the module currently used with a module becoming available utilizing the central module 140.

20 In the example of Fig. 1, the central module 140 is e.g. in a bag, the display 111 and the keyboard 110 on a table and the headphone-microphone combination (not presented) the user is wearing. In addition, the user has the possibility of using other devices in
25 his or her environment instead of the basic modules of his or her mobile station, such as e.g. a television 131 on the bookshelf of the living room instead of the small display 110 of the mobile station by means of the Bluetooth connection 120. The keyboard 130 of the
30 computer that is located in the same room with the mobile station functions as the keyboard of the mobile station thereby facilitating e.g. the conducting of longer interactive service transactions by means of the mobile station. In the home environment e.g. the
35 remoter controller 132 of a television functions as a keyboard using a Bluetooth connection 120 to the central module 140 of the mobile station 1. The central

module 140 identifies the modules available in its environment that have been classified into capacity classes. For example, the keyboard 130 of the computer is better as concerns its capacity classification than
5 the keyboard 110 of the mobile station's own, and the remote controller 132 of the television is in turn worse than the keyboard 110 of the mobile station's own. The central module offers available modules to the user to serve as an alternative user interface, in
10 which case the user chooses the available modules desired by him or her, the user brings the available modules desired by him or her into his or her use and leaves the modules previously in use in reserve.

In the example of Fig. 1, each module has its
15 own identifier which comprises a field for the utilization class of the module in question, a field for the state of the module in question, as well as a field for the capacity class of the module in question. The identifier is transmitted to the other modules including the central module 140 e.g. in signaling messages of the Bluetooth connection 120. In that
20 case, by means of the identifier in question, the central module 140 is capable of identifying and keeping record of the utilization and capacity classes of the
25 modules in its immediate environment.

The invention is not restricted merely to the examples of its embodiments referred to above, instead many variations are possible within the scope of the inventive idea defined by the claims.

CLAIMS

1. A modular wireless terminal device (1) which comprises:

one or more basic modules (110...11n), each
5 for performing some predetermined function of the terminal device in question that is in accordance with the utilization class, of which basic modules at least part communicates with each other by means of a wireless local connection (120),

10 characterized in that the terminal device further comprises:

one or more alternative modules (130...13n), each for performing some predetermined function of the terminal device in question that is in accordance with
15 the utilization class, of which basic modules at least part communicates with each other by means of the wireless local connection, and

a central module (140) which is used to identify the basic modules and alternative modules in the
20 immediate environment as well as to keep a record of them, which is used to identify the utilization classes of the aforementioned modules and to keep a record of them, which is used to identify the states of the modules in question and to keep a record of
25 them and which is used to replace a module with another module included in the same utilization class.

2. The wireless terminal device according to claim 1, characterized in that the central module is used to identify the capacity classes of the
30 basic modules and alternative modules and to keep a record of them.

3. The terminal device according to claim 2, characterized in that the central module is used to notify the user of the mobile station, if in
35 the immediate environment such a module becomes available that is included in the same utilization class

but in a better capacity class than some module in use at that moment.

4. The terminal device according to claim 2 or 3, characterized in that each module has
5 got its own identifier which comprises a field for the utilization class of the module in question, a field for the state of the module in question as well as a field for the capacity class of the module in question.

10 5. The wireless terminal device according to claim 1, 2, 3 or 4, characterized in that the basic modules can be physically separated from each other.

15 6. The wireless terminal device according to claim 1, 2, 3, 4 or 5, characterized in that the terminal device is a digital mobile station.

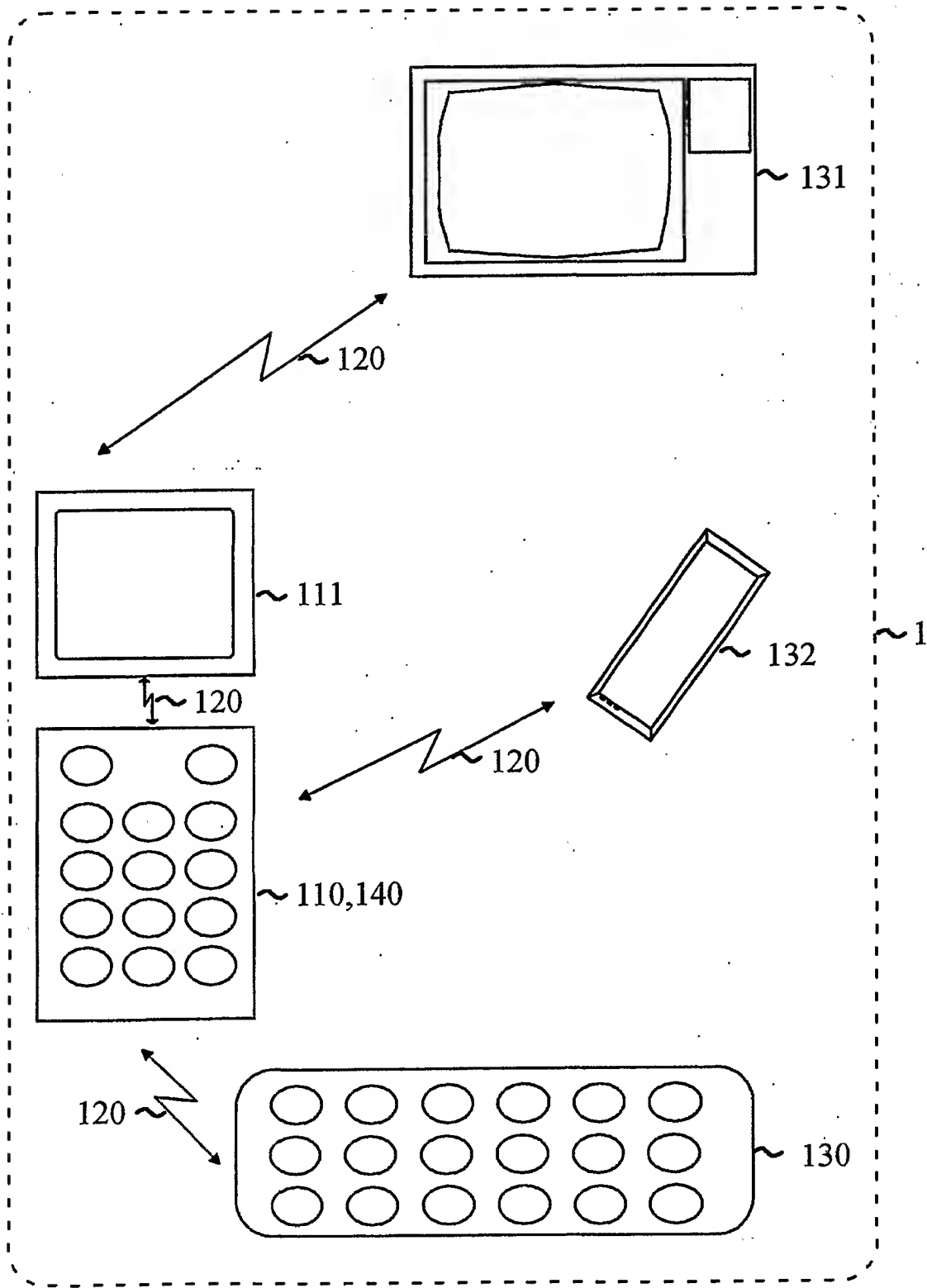


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 02/00085

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04L 12/56, H04L 12/28, H04Q 7/32
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04L, H04Q, H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 0079727 A2 (PAXGRID TELEMETRIC SYSTEMS INC.), 28 December 2000 (28.12.00), page 5, line 5 - line 10; page 8, line 1 - line 16; page 18, line 4 - page 20, line 6, page 22, line 11- line 20; page 27, line 10- page 29 line 23 --	1,2,5,6
A	WO 0101717 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)), 4 January 2001 (04.01.01), page 2, line 5 - line 19; page 6, line 13 - line 25; page 17, line 7 - page 18, line 1 --	1
A	WO 9911042 A1 (KONINKLIJKE PHILIPS ELECTRONICS N.V.), 4 March 1999 (04.03.99), page 5, line 19 - page 8, line 13 -- -----	1,4

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

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INTERNATIONAL SEARCH REPORT

Information on patent family members

01/05/02

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Patent document cited in search report			Publication date	Patent family member(s)		Publication date
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